Trend Study 28-15-03

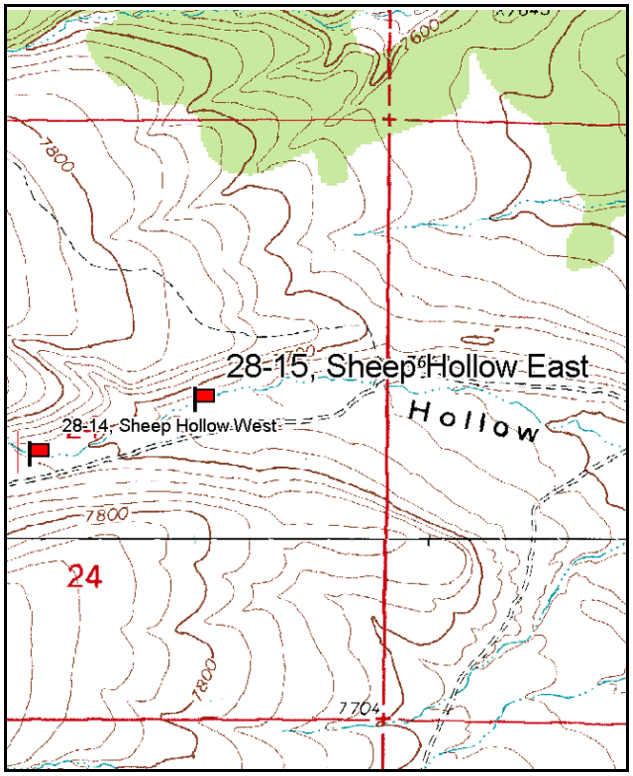
Study site name: Sheep Hollow East . Vegetation type: Black Sagebrush .

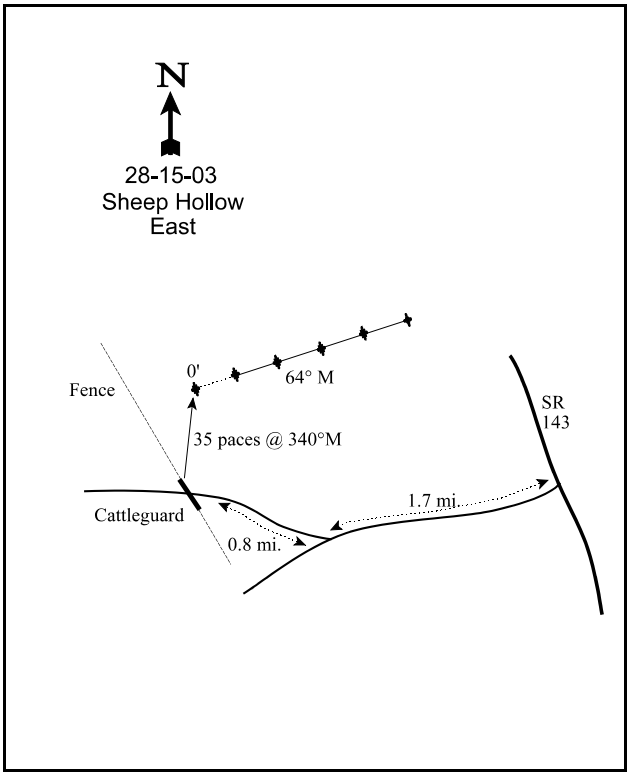
Compass bearing: frequency baseline 64 degrees magnetic.

Frequency belt placement: line 1 (11ft), line 2 (34ft), line 3 (59ft), line 4 (71ft), line 5 (95ft). Rebar: belt 5 on 1ft.

LOCATION DESCRIPTION

From Panguitch, head south on SR 143 to mile marker 47. Go 0.1 mile west of mile marker 47 and turn south onto a dirt road heading towards Sheep Hollow. Drive 1.7 miles to a fork. Stay right and continue 0.8 miles to a fence and cattleguard. The witness post is on the right side of the road just before the cattleguard. From the cattleguard, the 0-foot stake is 35 paces away at 340 degrees magnetic and is marked with browse tag #496.





Map Name: Panguitch

Diagrammatic Sketch

Township 35S , Range 6W , Section 24

GPS: NAD 27, UTM 12S 4179243 N, 370006 E

DISCUSSION

Sheep Hollow East - Trend Study No. 28-15

This study was established in 1998 in conjunction with study 28-14. It lies ½ mile to the east of study 28-14 and across the fence in a different grazing regime. The site drains gently to the east at 2-5%, and elevation is 7,700 feet. This site receives heavier grazing pressure than the previous study and was historically grazed by sheep until 1991 when use was changed to cattle. About 12 cows were utilizing the site during transect establishment in 1998. This pasture is permitted for 800 AUM's from June to October (1998 grazing management data). The cows are moved around the pasture by utilizing various water sources at different times of the grazing season. Wildlife also appear to be using this site more heavily than the previous study. Pellet group data from 1998 estimated 27 deer, 15 elk and 22 antelope days use/acre (67 ddu/ha, 37 edu/ha, and 54 adu/ha). A few antelope were seen near the site but most of the wildlife sign was old, likely from the previous winter. Pellet group data from 2003 estimated 33 deer and 31 cow days use/acre (83 ddu/ha and 77 cdu/ha). As with the previous site, antelope and deer pellets were combined in 2003 due to difficulty in identification.

Ground cover characteristics are very similar to the Sheep Hollow West study (28-14). However, soil on this site is more shallow with more rock concentrated near the surface compared to the adjacent study. Effective rooting depth is estimated at almost 12 inches. Soil texture is a sandy loam with a neutral pH (7.1). The profile is very rocky in most places, especially at the beginning of the baseline. Parent material is basalt. Erosion does not appear to be a serious problem on the site but some past erosion is evident in the form of severe soil pedestalling around bunchgrasses and shrubs. An erosion condition class assessment rated soils as stable in 2003. Two gullies also border the site. As with the previous study, vegetation and litter cover declined in 2003 while bare ground increased to over 30%.

This site supports a mix of black sagebrush, basin big sagebrush, and bitterbrush with a grass-forb understory. Black sagebrush is the most abundant shrub providing 21% cover in 1998 and 2003. Estimated density was 7,840 plants/acre in 1998 and 7,640 in 2003. This population is highly mature with moderate decadence at 28% and 25% in 1998 and 2003 respectively. There was a fair number of young in both surveys, but less than the number of plants classified as decadent and dying in both years. Utilization is mostly light to moderate, although a few plants are heavily hedged, and vigor is good on most plants. The densities of basin big sagebrush and bitterbrush are higher on this site compared to study 28-14. Basin big sagebrush density was estimated at 1,400 plants/acre in 2003. Some of the sagebrush on the site are hybrids between basin big sagebrush and black sagebrush and were classified mostly on growth form and foliage coloration. The increase in basin big sagebrush density in 2003 is mostly due to differences in identification between years. The basin big sagebrush on the site grow on scattered isolated patches of deeper soils. Basin big sagebrush had moderate decadence, low recruitment, and mostly light use in both surveys. Bitterbrush density was estimated at 600 plants/acre in both samples with most of the population being comprised of mature plants. Bitterbrush decadence was low in both readings, vigor normal, and use moderate to heavy. Annual leaders for black sagebrush and bitterbrush averaged 1 inch and 1.7 inches respectively in 2003.

The pinyon and juniper trees on this site were hand cut in the spring of 1998 with only a few scattered trees being left. Stickyleaf low rabbitbrush, broom snakeweed, Oregon grape, prickly pear, and gray horsebrush were also sampled on the site in small numbers.

The herbaceous understory is similar in diversity but not nearly as abundant compared to the Sheep Hollow West study site (28-14). Eleven species of perennial grasses, 1 annual grass, and 1 sedge were sampled in 1998. A few less species were sampled in 2003. In 2003, perennial species sampled in order of abundance were blue grama, bottlebrush squirreltail, mutton bluegrass, and Letterman needlegrass. Most of the preferred grass species are found growing under the protection of shrubs due to grazing. Blue grama is found in the

shrub interspaces, and being a warm season species, it would be less effected by livestock use than the cool season species. The forb component is very diverse, with fair abundance. Twenty-three perennial and 3 annual forbs were classified on the site in 1998. As with grasses, less forb species were sampled in 2003 due to drought. The most abundant perennial forbs include sulfur and redroot eriogonum, Indian paintbrush, low fleabane, skeletonweed, hoary aster, and longleaf phlox. Groundsmoke was the most abundant annual forb on the site in 2003.

1998 APPARENT TREND ASSESSMENT

The soil trend appears stable but erosion has occurred on this site in the past and 2 gullies near the site appear to be occasionally active. Trend for the key browse, black sagebrush and bitterbrush, appears stable but black sagebrush on this site has more decadent plants which were classified as dying than young plants to replace them. This may lead to a slight decline in shrub density in the future if reproduction does not improve. The herbaceous understory is similarly diverse as the adjacent site, but grass cover is one-half that of the Sheep Hollow West site, and 1/3 of the grass cover comes from blue grama, a warm season increaser. The forb component is also similarly diverse but composition is lacking in preferred species. Preferred forbs, Indian paintbrush, Eaton fleabane, redroot eriogonum, sulfur eriogonum, Lewis flax, and Utah deervetch on this site have a sum of nested frequency value 3½ times lower and provide 1/4 less cover than the adjacent Sheep Hollow West site.

2003 TREND ASSESSMENT

Trend for soil is down. Decreases in vegetation and litter cover and a corresponding increase in bare soil translates into less protective cover on the soil surface to guard against erosion. Erosion is low at the present time, but could increase when precipitation patterns improve. Trend for browse is stable overall, although black sagebrush is showing signs of decline. Decadence in the black sagebrush population remained nearly stable, but the proportion of the decadent age class classified as dying increased from 16% to 44%. Although recruitment improved in 2003, the number of young in the population is not adequate to replace these individuals should they die-off. Overall density will probably be slightly less by the next reading. Use remains light and vigor is generally good. Basin big sagebrush has a higher density estimate, but with few young in 1998, most of this difference is due to classification differences between black sagebrush and basin big sagebrush between years. Bitterbrush density remained stable in 2003 and the population has low decadence, good vigor, and receives continued heavy use. Trend for the herbaceous understory is down. Both perennial grasses and forbs have lower sum of nested frequency values in 2003.

TREND ASSESSMENT
soil - down (1)
browse - stable (3)
herbaceous understory - down (1)

HERBACEOUS TRENDS --
Management unit 28 , Study no: 15

Type	Species	Nested Frequency '98	Nested Frequency '03	Average Cover % '98	Average Cover % '03
G	Agropyron intermedium	3	-	.01	-
G	Agropyron smithii	2	8	.01	.01
G	Bouteloua gracilis	175	137	2.76	1.14
G	Bromus carinatus	b23	a-	.12	-
G	Bromus tectorum (a)	7	9	.02	.01
G	Carex spp.	3	-	.06	.00
G	Koeleria cristata	3	3	.03	.15
G	Oryzopsis hymenoides	4	-	.18	-
G	Poa fendleriana	40	40	.76	.23
G	Sitanion hystrix	b116	a60	1.57	.46
G	Stipa columbiana	9	7	.21	.04
G	Stipa comata	16	8	.38	.07
G	Stipa lettermani	b62	a19	1.63	.18
Total for Annual Grasses		7	9	0.02	0.01
Total for Perennial Grasses		456	282	7.76	2.30
Total for Grasses		463	291	7.78	2.32
F	Alyssum alyssoides (a)	6	-	.01	-
F	Arabis spp.	b11	a-	.05	-
F	Astragalus convallarius	11	13	.22	.11
F	Astragalus spp.	9	13	.02	.02
F	Castilleja linariaefolia	17	10	.16	.04
F	Calochortus nuttallii	-	5	-	.01
F	Chaenactis douglasii	7	1	.02	.03
F	Chenopodium leptophyllum(a)	-	3	-	.00
F	Cryptantha spp.	b6	a-	.04	.00
F	Descurainia pinnata (a)	2	-	.01	-
F	Erigeron divergens	b20	a-	.15	-
F	Erigeron eatonii	7	-	.01	-
F	Erigeron flagellaris	8	-	.38	-
F	Erigeron pumilus	b25	a6	.11	.04
F	Eriogonum racemosum	23	24	.21	.17
F	Eriogonum umbellatum	31	28	.49	.30
F	Euphorbia robusta	5	4	.09	.06
F	Gayophytum ramosissimum(a)	a-	b108	-	.60

Type	Species	Nested Frequency		Average Cover %	
		'98	'03	'98	'03
F	Gilia spp. (a)	4	-	.01	-
F	Leucelene ericoides	-	2	-	.03
F	Linum lewisii	9	3	.05	.01
F	Lotus utahensis	4	-	.06	-
F	Lupinus argenteus	12	2	.25	.07
F	Lychnis drummondii	1	4	.00	.01
F	Lygodesmia spinosa	23	29	.18	.14
F	Machaeranthera canescens	$_{b}$28	$_{a}$5	.15	.09
F	Oenothera pallida	17	3	.08	.00
F	Phlox longifolia	23	13	.08	.03
F	Senecio multilobatus	1	-	.03	-
F	Trifolium spp.	2	-	.00	-
Total for Annual Forbs		12	111	0.03	0.61
Total for Perennial Forbs		300	165	2.89	1.19
Total for Forbs		312	276	2.92	1.80

Values with different subscript letters are significantly different at alpha = 0.10

BROWSE TRENDS --
Management unit 28 , Study no: 15

Type	Species	Strip Frequency		Average Cover %	
		'98	'03	'98	'03
B	Artemisia nova	96	87	20.73	21.42
B	Artemisia tridentata tridentata	9	26	.77	6.57
B	Ceanothus fendleri	1	0	-	-
B	Chrysothamnus parryi	0	1	-	-
B	Chrysothamnus viscidiflorus viscidiflorus	9	7	.24	.59
B	Gutierrezia sarothrae	1	2	.03	-
B	Mahonia repens	9	9	.01	.06
B	Opuntia spp.	3	2	-	-
B	Pediocactus simpsonii	0	1	-	-
B	Pinus edulis	1	2	.03	.30
B	Purshia tridentata	23	21	4.14	5.08
B	Tetradymia canescens	1	0	-	-
Total for Browse		153	158	25.96	34.04

CANOPY COVER, LINE INTERCEPT --
Management unit 28 , Study no: 15

Species	Percent Cover '03
Artemisia nova	21.60
Artemisia tridentata tridentata	10.26
Chrysothamnus viscidiflorus viscidiflorus	.21
Gutierrezia sarothrae	.26
Mahonia repens	.05
Pinus edulis	.10
Purshia tridentata	7.68

KEY BROWSE ANNUAL LEADER GROWTH --
Management unit 28 , Study no: 15

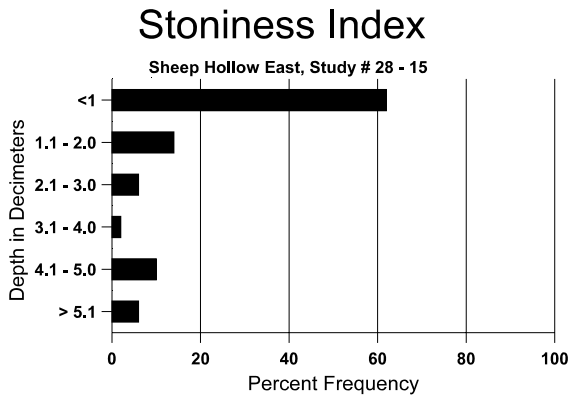
Species	Average leader growth (in) '03
Artemisia nova	1.0
Purshia tridentata	1.7

BASIC COVER --
Management unit 28 , Study no: 15

Cover Type	Average Cover %	
	'98	'03
Vegetation	44.70	37.75
Rock	5.99	8.08
Pavement	6.91	5.80
Litter	45.79	37.56
Cryptogams	.04	.18
Bare Ground	16.03	30.54

SOIL ANALYSIS DATA --
Management unit 28, Study no: 15, Study Name: Sheep Hollow East

Effective rooting depth (in)	Temp °F (depth)	pH	%sand	%silt	%clay	%0M	PPM P	PPM K	ds/m
11.5	59.3 (12.7)	7.1	62.7	21.4	15.8	2.6	24.8	262.4	0.3



PELLET GROUP DATA --
Management unit 28 , Study no: 15

Type	Quadrat Frequency		Days use per acre (ha)	
	'98	'03	'98	'03
Rabbit	3	12	-	-
Elk	5	1	15 (37)	-
Deer	27	27	49 (121)	33 (83)
Cattle	6	3	-	31 (77)

BROWSE CHARACTERISTICS --
Management unit 28 , Study no: 15

		Age class distribution (plants per acre)					Utilization				
Year	Plants per Acre (excluding seedlings)	Seedling	Young	Mature	Decadent	Dead	% moderate	% heavy	% decadent	% poor vigor	Average Height Crown (in)
Artemisia nova											
98	**7840**	220	320	5320	2200	1180	35	7	28	5	18/28
03	**7640**	-	460	5300	1880	1060	17	1	25	11	13/19
Artemisia tridentata tridentata											
98	**260**	-	20	180	60	80	31	0	23	0	40/48
03	**1400**	-	-	1000	400	240	6	0	29	7	32/37
Ceanothus fendleri											
98	**20**	-	20	-	-	-	0	0	-	0	-/-
03	**0**	-	-	-	-	-	0	0	-	0	-/-
Chrysothamnus nauseosus											
98	**0**	-	-	-	-	-	0	0	-	0	26/24
03	**0**	-	-	-	-	-	0	0	-	0	-/-

		Age class distribution (plants per acre)					Utilization				
Year	Plants per Acre (excluding seedlings)	Seedling	Young	Mature	Decadent	Dead	% moderate	% heavy	% decadent	% poor vigor	Average Height Crown (in)
Chrysothamnus parryi											
98	**0**	-	-	-	-	-	0	0	-	0	-/-
03	**20**	-	-	20	-	-	0	0	-	0	8/10
Chrysothamnus viscidiflorus viscidiflorus											
98	**260**	-	20	220	20	-	8	0	8	0	8/15
03	**300**	-	-	300	-	-	0	0	0	0	6/10
Gutierrezia sarothrae											
98	**20**	-	-	20	-	-	0	0	-	0	7/18
03	**40**	-	-	40	-	40	0	0	-	0	8/16
Mahonia repens											
98	**880**	-	80	800	-	-	0	0	-	0	-/-
03	**520**	-	40	480	-	-	0	0	-	0	2/3
Opuntia spp.											
98	**60**	-	-	60	-	-	0	0	-	0	8/6
03	**40**	-	-	40	-	-	0	0	-	0	6/9
Pediocactus simpsonii											
98	**0**	-	-	-	-	-	0	0	-	0	-/-
03	**20**	-	-	20	-	-	0	0	-	0	2/3
Pinus edulis											
98	**20**	-	20	-	-	20	0	0	-	0	-/-
03	**40**	-	40	-	-	-	0	0	-	0	-/-
Purshia tridentata											
98	**600**	-	40	540	20	20	53	33	3	0	31/50
03	**600**	-	20	500	80	-	3	97	13	0	31/51
Rhus trilobata											
98	**0**	-	-	-	-	-	0	0	-	0	-/-
03	**0**	-	-	-	-	-	0	0	-	0	14/23
Tetradymia canescens											
98	**20**	-	-	20	-	-	0	0	-	0	12/18
03	**0**	-	-	-	-	-	0	0	-	0	-/-